

STATEMENT OF JOHN W. BARNUM, DEPUTY SECRETARY OF TRANSPORTATION, BEFORE THE HOUSE INTERSTATE AND FOREIGN COMMERCE SUBCOMMITTEE ON ENERGY AND POWER, REGARDING CONSTRUCTION PROBLEMS ON THE TRANS ALASKA OIL PIPELINE, MONDAY, JUNE 21, 1976.

Mr. Chairman and Members of the Subcommittee:

I appreciate this opportunity to appear before you today to discuss the problems with weld quality on the Trans Alaska oil pipeline presently under construction.

First, I would like to summarize briefly the general responsibilities and activities of the Department of Transportation with regard to the construction and operation of the Trans Alaska pipeline.

Under the authority of the Transportation of Explosives Act (18 U.S.C. 831-135), DOT has established safety regulations for the design, construction, operation and maintenance of pipelines operated by carriers engaged in interstate commerce which transport liquid hazardous materials including petroleum and petroleum products (49 CFR Part 195). These standards apply to the Trans Alaska Pipeline System. In addition, the agreement and grant of right-of-way between the Department of the Interior and Alyeska Pipeline Service Company stipulates that Alyeska shall construct and operate the pipeline in accordance with these DOT pipeline safety standards. DOT is also a member of DOI's Technical Advisory Board, which was established as part of a DOI task force on Alaskan oil development. In that capacity DOT has had an opportunity to provide technical advice to DOI concerning the design and construction of the pipeline, as well as the development of the environmental impact statement for the pipeline.

DOT's responsibilities with respect to pipelines are handled by the Office of Pipeline Safety Operations, which is an element of the Department's Materials Transportation Bureau.

Our involvement during the construction phases of this project has included the following specific actions:

DOT regulations require adequate protection against corrosion for each new pipeline being constructed. In this connection the pipe manufactured for the Alaskan pipeline was coated for corrosion protection with a thin film epoxy in the coating mills in Alaska in 1971. We inspected the coating operation at the Fairbanks mill to assure that the coating was being applied in accordance with sound construction procedures. Pursuant to our recommendation the procedures were revised to eliminate excessive dust left on the pipe after shot cleaning and prior to coating. To improve corrosion control protection, DOT approved two tapes for use over the mill coated epoxy as part of Alyeska's corrosion control plan.

The structural design of this pipeline is unique for cross-country pipelines in that stresses due to temperature and seismic activity must be provided for, as well as the usual stresses which act on a pipeline from internal pressures. DOT, with contractor assistance, determined that the final stress design would result in reasonable and adequate margins of safety against failure.

During 1975 DOT engineers made four inspection trips to the pipeline. Of particular concern at that time was the proper implementation of the corrosion control plan. Inspections made during these trips prompted

improvements in the application of primer to weld areas prior to wrapping with tape. Based on our observations with respect to the corrosion control aspect of the construction, we recommended to Alyeska and DOI that steps be taken to effect a general upgrading of inspection by Alyeska's quality control inspectors.

I would now like to discuss the girth weld quality problem and specifically DOT's concern in this matter.

The problem first came to light in early September 1975, when Peter Kelly sued his former employer, Ketchbaw Industries. Ketchbaw was the contractor providing radiographic inspection of girth welds on the pipeline south of the Yukon River. The suit alleged falsification of some radiographs by Ketchbaw.

One of the DOT inspection trips to which I referred earlier was made during the last two weeks in September 1975. On that occasion we learned of Alyeska's efforts to audit the radiographic inspection of girth welds.

On October 31, 1975, DOT received the Alyeska audit report for Section 3 of the pipeline. (The pipeline is divided into five sections.) Shortly after the receipt of the first audit report, we were advised that the audit would extend to the entire pipeline.

During the last week in March we were informed by DOI that the audit was nearing completion and that a large number of welds were found to be irregular. In early April, DOT wrote to DOI and to Alyeska requesting a complete briefing on the weld quality problem.

In response to this request, a meeting was held in Anchorage on May 4 and 5, 1976, to discuss the results of the audit. Present at the meeting were representatives of DOI, the State of Alaska, Alyeska and DOT. A summary of the complete audit received by DOT at that meeting covered all of the approximately 30,800 radiographs of girth welds taken in 1975. The radiographs had been read and reinterpreted and identifying features of each of the radiographs has been put into a computerized data bank. Computer analysis of those weld features, or "fingerprints," identified potentially duplicated radiographs. The audit identified 3,955 weld irregularities.

The weld problems can be broken into two general categories. The first category concerns missing, incomplete or otherwise defective radiographs of certain welds. The DOI-Alyeska agreement and grant of right-of-way requires that all main line girth welds be radiographed. The second category concerns welds which, upon re-examination by the Alyeska auditors, were found to be in violation of DOT regulations. The DOT regulations require that welds be in accordance with Section 6 of American Petroleum Institute Standard 1104 (API-1104). The majority of the weld irregularities which fall into the second category are welds which, because of size or type of defect, do not meet the standards of acceptability established by Section 6 of API-1104.

With regard to the first category of 1975 welding problems--missing or defective radiographs--Alyeska has proposed to employ a new inspection technique to inspect the welds in this category which, by virtue of their location, i.e. under rivers or buried in the permafrost region, would be

costly to radiograph or potentially injurious to the ecology. This new technique is called acoustic imaging. It uses ultrasonic energy to produce an optical image, or picture, of the sample being tested. The advantage of the acoustic imaging inspection technique would be that only the inside of the weld has to be exposed. In radiography the radiation source and the film must be on opposite sides of the weld, which means that a buried weld must be exposed by excavation in permafrost or by pulling pipe out from under a riverbed. The acoustic inspection device would be used to inspect the welds from inside the pipe.

On May 27 a demonstration of the acoustic imaging system was conducted in Richland, Washington. Representatives from DOI, the State of Alaska and DOT attended the demonstration. Alyeska plans to conduct tests in Fairbanks, Alaska, commencing around July 1, 1976. We will also attend those tests and subsequently we will determine whether the technique can identify weld defects with the same degree of effectiveness as radiography.

With regard to the welds in the second category--those which have unacceptable defects as revealed by existing radiographs--DOT safety regulations require that all such irregularities be corrected by repair or replacement. Alyeska has informed DOT that as of May 30, 1976, 1,425 of the identified unacceptable girth welds have been repaired by Alyeska. Alyeska is continuing this corrective action. DOT will require satisfactory verification of the corrective actions. You should also know, however, that Alyeska indicated at the May meeting in Anchorage, in correspondence with DOI, and at a meeting I had with Alyeska and DOI officials at the end of last month, that it did not believe that all of

the identified irregular welds would have to be repaired. Alyeska has identified 1,015 of the welds in both categories--missing radiograph or unacceptable defects--as "critical welds", which Alyeska defines as those welds "located in sensitive and/or very difficult access related areas in which [they contend] any remedial work will likely degrade the end product quality and/or create substantial environmental concerns". Alyeska has proposed in a letter to DOI that an alternative method to API-1104 standards be used to test the welds for acceptability. Alyeska has commissioned the British Welding Institute to conduct a program of critical fracture mechanics to determine the acceptability of this alternative method. Alyeska believes that the alternative method for determining weld acceptability will not affect the integrity of the pipeline under stress conditions to which the welds would be subject during operations.

DOT has not received a request from Alyeska for a waiver of its welding requirements and therefore has not made a determination concerning the merits of the Alyeska proposal. As I stated earlier, DOT's present position is that all of the weld irregularities should be corrected in compliance with our safety regulations.

However, DOT is prepared to evaluate any reasonable proposal, together with supporting data. The Trans Alaska Pipeline does reflect some pertinent advances in the state of the art, particularly in metallurgy. The problem is to evaluate the effect on integrity of pipe, and welds, that are in the ground. The objective is to attain assurance that all corrective action required for system integrity is completed, without requiring further action that would not contribute to integrity assurance but would

add to the cost and time to complete the pipeline. In this respect we are not unmindful of the benefits of timely completion. Accordingly, although there is not any waiver request pending before us, DOT is pursuing independent action to investigate and evaluate weld quality and resulting effects on system integrity.

While DOT has expertise in many of the disciplines required for these purposes, other resources will also be used as required. For example, DOI has initiated discussion with Southwest Research Institute with a view to the development of a fracture mechanics test program to evaluate Alyeska's proposal. DOT is also pursuing an active and independent role in the investigation of weld quality. DOT has employed fracture mechanics experts from the National Bureau of Standards to assist in our evaluation and monitoring of fracture mechanics testing. To date they have attended, as observers, the initial meeting at Southwest Research Institute, and these NBS experts are presently in London for a briefing on the work being performed by the British Welding Institute for Alyeska.

Thus, we have begun at an early stage to observe the fracture mechanics test and analysis work being undertaken by Alyeska and DOI. This will facilitate DOT's independent review of the results of these efforts, and our determinations as to further action by DOT.

Mr. Chairman, this ends my prepared statement. I would be pleased to answer any questions you or the other Members of the Subcommittee might have.

